

system it is allied to *Hircinia* and *Euspongia*. It occupies an intermediate position between the known types.

I bestow the name *Sarcomus* \* on this new genus, which appears to me to deserve a new family. The species from the environs of Nice I designate *Sarcomus Georgi* †.

XXII.—*Notes from the St. Andrews Marine Laboratory (under the Fishery Board for Scotland).*—No. XII. By Prof. M'INTOSH, M.D., LL.D., F.R.S., &c.

1. Preliminary Note on the Occurrence of the Pelagic Annelids and Chatognaths in St. Andrews Bay throughout the Year.
  2. On the British Species of *Spinther*.
  3. On the Young Stages of the Gunnel (*Centronotus gunnellus*).
1. *Preliminary Note on the Occurrence of the Pelagic Annelids and Chatognaths in St. Andrews Bay throughout the Year.*

The following remarks on the pelagic Annelids of the Bay of St. Andrews are preliminary, and formed indeed part of a survey of the whole pelagic forms from fishes downwards during the year 1888—especially in their relation to the fisheries ‡.

So far as regards the marine *Polychæta* the contrast with southern waters is marked, since hitherto there has been an absence of such typical pelagic Annelids as the Alciopidæ, so well described by Greef §, or the Syllidians, which have lately received the careful attention of Viguier ||. The only adult pelagic forms, indeed, are *Autolytus* and the sexual forms of the Nereides. All the others are larval, postlarval, and young stages of Annelids, and thus fall under the temporarily pelagic group. They often occur in large numbers and probably exercise an important function in connexion with the food of post-larval and young fishes, for it is well known that

\* From *σάρκωμα*, a fleshy excrescence.

† Named after Georges Guessler, a very skilful diver employed by me, and who obtained for me the first specimen of this sponge. Since then I have often collected it myself.

‡ I have the same acknowledgment to make as in the previous note (XI.) in regard to the assistance given me in the examination of the various nets by Mr. J. Pentland Smith, M.A., B.Sc.

§ "Untersuchungen über Alciopiden," Nova Acta L. C. 39.

|| "Sur les Animaux inférieurs, II. Annelides Pelagiques," Archiv. Zool. Expér. 2<sup>e</sup> sér. iv. p. 347.

no group is more eagerly followed by the fishes than the marine Annelids.

As in certain groups the spawning-period of the Annelids is considerably prolonged (though not necessarily in individuals), that is, larvæ of the same species are found during several months, a constant succession of young forms taking the place of those which have advanced to the later stages after undergoing changes more or less noteworthy, and many of which settle on new sites on the bottom or amidst the rocks to form fresh colonies. A large number of these young stages are caught near the bottom by the trawl-like tow-net\*, and they are only occasionally to be found near the surface under favourable conditions of temperature and the sea itself.

The great larval bristles so characteristic of the young of the Spionidæ do not seem to prevent in all cases their being eaten by young fishes, though the observations are as yet too few to enable definite conclusions to be made on this point. These long bristles, however, may constitute an effectual guard from the attacks of the smaller predatory Invertebrates, which otherwise would prey on them. They certainly form a striking fringe in the early stages, and the metallic lustre in some species gives them no little beauty.

*Tomopteris*, formerly considered somewhat rare, is a form which frequents the inshore waters from January to December. The enormous numbers of the Chætognaths again almost throughout the entire year is a feature of moment in connexion with the food of fishes, which readily devour them. In some inshore areas the bag of the large midwater-net, after a brief haul in autumn, is distended with a semisolid mass of them.

The activity of the post-larval Annelids is great. They glide rapidly through the water and often circle nimbly in a limited area and again shoot towards the side of the vessel next the light, where they collect like the Copepoda. They are also voracious; for instance, a post-larval *Nerine* (*cirratulus*?) seized on the tail of a *Scolecoplepis* a little less than itself, and it was only after a severe struggle, in which both exerted themselves desperately, that the latter managed to withdraw its tail—now considerably injured—from the eager mouth of the *Nerine*.

In the beginning of January various marine Annelids present symptoms of maturity, such as the Polynoidæ and

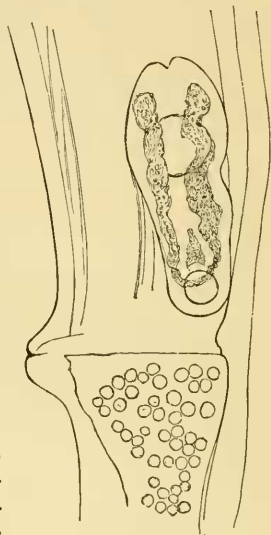
\* As formerly mentioned this net is invaluable in such investigations, bringing to light, for instance, such forms as *Agalmopsis* and *Hypocodon*, which otherwise would have escaped notice.

*Arenicola*, and yet the latter has been found equally mature in October. The Polynoidæ especially are early in this respect both in Europe and America. None of their pelagic larvæ, however, have hitherto been found at St. Andrews in January. Hensen\*, again, in the Baltic procured only a very few larvæ of *Polydora* during this month.

*Tomopteris* at St. Andrews occurred on many occasions; indeed its absence from the tow-nets was rarer than its presence.

*Sagittæ* of various sizes were abundant and some were large, with advanced reproductive organs, as Lo Bianco and others found at Naples. Their occurrence in large numbers in winter has long been known †, and the multitudes of fine living examples stranded on the beach sparkle like needles of glass. The larger forms (about 1 inch) were captured in the midwater-nets and the smaller (about  $\frac{1}{2}$  inch) in the surface- and bottom-nets. A considerable number of the larger specimens had a parasitic Nematoid in the alimentary canal, while some presented a Trematode in the same situation (see woodcut).

Next month (February) the pelagic Annelids were represented by females of *Autolytus* with the ventral ovigerous sac and males. The midwater-net also captured an epitocous *Nereis* (olim *Iphinereis fucicola*), which in former years had been tossed on shore by storms. Young Polynoidæ (*Harmothoë imbricata* &c.) escaped from the ova in the tanks, but none were recognized in the contents of the nets. The larval *Nerine* with the reticulated investment, and which has also been found in the Forth in February by Messrs. Cunningham and Ramage †, and larval examples of *Polydora* also occurred. In regard to the latter, Hensen found this month and the next most prolific of them in the Baltic, and he gives the spawning-period as from October to April. The bristles



Trematode at anal septum of *Sagitta*.

\* Fünfte Bericht der Kommission &c. (Berlin, 1887).

† *Vide* Ann. & Mag. Nat. Hist. 4th ser. xiv. p. 155 (1874).

‡ Trans. R. Soc. Edinb. vol. xxxiii. pt. 3, p. 638, pl. xxxvii. fig. 2 H.

(paleolæ) of *Sabellaria spinulosa* and *Harmothoë imbricata* were common in the bottom-net. *Tomopteris* about half-grown occurred in midwater-, bottom-, and surface-nets. If there was any difference in size it was in favour of those from the bottom-nets.

The Chætognaths were extremely abundant, especially in the midwater-net, and many were almost mature. The larger forms in this net measured  $1\frac{1}{2}$  inch, and some of the same size were seen in the other nets. Besides the Trematode parasite several showed a larval Trematode in front of the caudal septum.

The same forms were found in March so far as it was possible to examine during the intervals of storms. Many of the littoral Polynoidæ continued fully ripe, such as *Harmothoë*, *Evarne*, and *Lepidonotus*. Though it is known that certain of the Nemerteans spawn at this time, no larval forms occurred in the tow-nets, in which they seem to be rarely found.

Amongst the Annelids in April were also *Autolytus prolifer* and the epitocous form of *Nereis* (*Iphinereis*). The former bred freely in the laboratory and their variations in colour were noteworthy. Viewed from the dorsum many females are pinkish with dark brown eyes. The ovigerous region is reddish and green, the former chiefly characterizing the segment-junctions. The succeeding region is greenish in front, pale posteriorly. Ventrally the colours are similar but fainter. The alimentary canal has a dull yellowish coat. The coloration of the ova and embryos in the sac in some cases is pale, in others dull yellowish or greenish. The young after emergence agreed with the descriptions of previous authors, and appeared to be more elongated than the larval examples of *Autolytus cornutus* of Alex. Agassiz\* before the tentacles appeared. Agassiz found his forms in April. The reproductive period of *A. prolifer* in this country is prolonged.

No example of *Alitta virens* was procured in any of the nets; yet the beach in former years in March and April has often been strewn with splendid examples, some more than 3 feet in length. They would therefore not seem to be so characteristically pelagic at the reproductive season as *Palolo*, the Syllidians, or other Nereids.

*Tomopteris* was frequent and of fair size (1 inch), while the Chætognaths were on the whole less conspicuous than in the previous month, though some reached  $\frac{5}{8}$  inch long. A

\* "On Alternate Generat. in Annel.," Journ. Bost. Soc. Nat. Hist. vii. p. 392.

few were mature at the beginning of the month, but the majority were immature or had spawned. This corresponds with the condition in the Neapolitan forms.

The Annelids mentioned as occurring in April likewise were present in May, while there was a decided increase in the larval forms pertaining to other genera. Thus trochospheres of *Phyllodoce* and *Eulalia* frequently appeared along with young *Magelona*, which agreed in most points with the description and figures of Claparède, though he does not make it clear that the young *Magelona* has at first only slender spine-like papillæ on its elongated tentacles, as in *Spio*, and that the characteristic thick cylindrical ones are developed first at the base. Thus in some pelagic examples about 4 millim. in length (body) both kinds exist on the organs. The young forms referable to Claparède's fig. 12, Taf. x.\*, seem to be *Spio*-like, and show no circulation of corpuscles in the tentacles, while those resembling his fig. 10 have active corpuscular circulation in the tentacles, the distal parts of which are readily lost. Moreover, the former is occasionally considerably larger than the latter. When the circulation is established in the tentacles a small rounded black eye appears at the anterior and inner border of each tentacle, while two small and indefinite pigment-specks occur on each side of the middle line in front of the mouth and nearly in a line with the outer eyes. Further investigation therefore is necessary to clear up the doubtful points. These young examples swim freely, with a wriggling motion, after coiling the long tentacles like a spring, and again settle on the bottom or at the surface and stretch out the two long tapering tentacles. Numerous young Terebellids in the transparent sheaths were common in the bottom-nets.

The only form observed in the midwater-net during June was *Tomopteris*, which appeared once in considerable numbers and from 1 to 1½ inch in length. Numerous ova occurred in the perivisceral diverticula of the feet. Chætognaths were obtained in the same net, but they were comparatively few and small, only the larger forms reaching 15 millim. This therefore differed from the condition during the winter months, when the bay teemed with large and active *Sagittæ*. The bottom-net was extremely rich as the month advanced in larval forms of *Nerine* (two species), *Polydora*, and other Spionidæ, such as *Magelona*. Young *Harmothoë imbricata* with four scales and seven bristled feet, advanced young of *Nephtys* with a pair of eye-spots opposite the third bristled

\* Beobach. über Anat. u. Entwicklungsgesch. &c. (Leipzig, 1863).



foot, the tip of one tentacle being bifid, males of *Autolytus prolifer*, advanced young of *Phyllodoce maculata*? about 4 millim., *Eumida sanguinea* of about sixteen bristled segments, *Polydora* of twenty segments, *Eteone* of twenty-five segments, *Eulalia* of 6 millim., and young of *Amphicora* were other forms occasionally met with in the bottom-net. Though less abundant than the Copepods they formed a prominent feature in the pelagic life and made a notable addition to the food of the post-larval fishes, which as they get older seek the bottom. When the nets were worked close to the rocky margins the larval forms of *Spirorbis* were also common. Numerous *Polydoræ* and *Mageloneæ* were still in the mature condition, so that the spawning-period extends over a considerable area.

A decided increase in the number of pelagic larval Annelids took place in July. In every instance they were present in greater or less numbers in the bottom-nets, while as the month advanced they likewise became frequent in the surface-nets. The most abundant were the larval and postlarval forms of *Spio*, *Polydora*, and *Nerine*. *Terebelle* and *Nicoleæ* were also common, and a few of the older examples of these strengthened the hyaline tube with particles of sand and mud. Minute postlarval Polynoidæ occurred frequently in the bottom-nets. It is rare, so far as present experience goes, to find many young Polynoidæ between tide-marks, where the adults are so common, and their abundance in the bottom-nets at a distance from the shore, in a truly pelagic condition, partly explains the reason. Besides the foregoing, minute postlarval forms of *Eulalia*, *Castalia*, *Pholoë*, *Capitella*, and *Aricia* were also procured. On the whole the wealth of pelagic larval Annelids was noteworthy.

The Chaetognaths were less conspicuous close inshore and they chiefly appeared in the midwater-net. Yet perhaps they were not far removed, since in former years masses were obtained at the end of the month in the midwater-net on the wolf-fish-ground towards the mouth of the Forth.

The larval Annelids attained their maximum in August, the same forms occurring in the bottom-net as during July. Some of the post-larval Polynoidæ reached  $\frac{1}{2}$  inch in length. The use of the net beyond the Bay, as off the Bell Rock and south-east of the Island of May, showed that the same types abounded in these regions. *Tomopteris* was comparatively rare.

The midwater-net captured *Tomopteris* somewhat more frequently along with an occasional *Nereis*, probably from pelagic seaweeds or débris, or perhaps from accidentally

touching the ground. The larval forms of *Nerine*, *Polydora*, *Polynoë*, and *Terebella* were also obtained; but this net was less productive of *Polychæta* than the bottom-net.

In the surface-net, in addition to the forms already mentioned, larvæ of *Nereis* and young forms of *Magelona papillicornis* appeared. *Tomopteris* was procured only once. In the open sea near the Bell Rock the chief novelty was a young example of *Hermadion pellucidum*.

Throughout September the bottom-nets were especially rich in the larval, post-larval, and young Annelids, the most conspicuous being still those of the Spionidæ, e. g. *Nerine*, *Spio*, and *Polydora*, from the minute larvæ with the enormous bristles to the more elongated forms with a pair of tentacles. The fifth body-segment in the *Polydoræ* showed the characteristic bristles with the hook at the tip, and some reached 2.5 millim. in length. The abundance of *Polydora* is not surprising, since it is one of the most common species in the sea, perforating the rocks along the beach and shells—both living and dead—from the tidal margin to deep water. The adult forms of *Nerine*, *Scolecoclepis*, and *Spio* are also very frequent between tide-marks.

Besides the foregoing was a young *Aphrodita* 5 millim. long, trochospheres of Polynoidæ with post-larval and young forms, a young example of *Laenilla setosissima* about 1 millim. long with bristles and scales, a young specimen of *Pholoë minuta* with four pairs of parapodia, a young *Nephtys* with six pairs, a caudal style of two segments articulated like the glandular hair of a plant, and a young *Cirratulus* about 3 millim. long. Young Phyllodocidæ, *Terebellæ*, and Ariciidæ, unknown trochospheres, and a young Turbellarian of a light greenish colour by transmitted light were also present. *Autolytus prolifer*, after an absence of some weeks, again made its appearance this month.

The midwater-net presented a contrast to the foregoing, since larval forms of the Spionidæ only were observed occasionally, and once a young example of *Nerine*  $\frac{1}{4}$  inch long. On the other hand, *Tomopteris*  $\frac{3}{4}$  inch in length was obtained several times, though sparingly. *Sagittæ* also occurred frequently in this net, but in small numbers, except on the 5th. They ranged from 12 to 16 millim.

Larval Annelids were much more frequent in the surface-nets than in the latter, though they fell far short of the bottom-net in this respect. The majority pertained to the Spionidæ, as already explained, and some were obtained in every haul of the net, though larval forms of the Polynoidæ occurred occasionally. *Tomopteris* appeared only once, but

the finest example in the museum was procured this month. A few *Sagittæ* 18 millim. long were present once.

Throughout October the larval Annelids still abounded in the bottom-nets, demonstrating how ample the food-supplies of the smaller fishes are from this group during a considerable period of the year. The forms consisted chiefly of the larvæ of *Nerine*, *Polydora*, and *Polynoë*. *Sagittæ* were obtained sparingly in this net in the earlier part of the month, but at the end they were very numerous and ranged from 8 to 15 millim.

In the midwater-net *Tomopteris* occurred occasionally in small numbers, ranging from  $1\frac{1}{2}$  inch in length downwards. Very few *Sagittæ* appeared in this net, and only on one occasion.

In the surface-net the larval stages of *Nerine* and *Polydora* were captured along with a few small examples of *Tomopteris* during the first half of the month. The paucity of their numbers formed a contrast with those immediately preceding.

In November the surface-net gave only a very few small specimens of *Tomopteris*, while the bottom-net, besides a few similar specimens, added a few Nematodes. These free Nematodes are occasionally got at considerable depths. *Sagittæ*, again, of good size occurred in all the nets and often in great numbers. They took the place of the absent Hydro-medusæ.

The paucity of Annelidan life was equally marked in December. In the surface-net a single *Tomopteris*  $\frac{3}{4}$  inch long was obtained. The same form occurred in the midwater-net occasionally from  $\frac{1}{2}$  to  $\frac{3}{4}$  inch. In the bottom-net only bristles of *Sabellaria* and *Nereis* with fragments of *Polynoë* were taken. The same bristles moreover occurred in the contents of a tow-net sent me by Mr. Shrubsole from Sheerness-on-Sea.

The *Sagittæ*, again, were remarkably numerous and large. In the surface-net and in the bottom-net they appeared in similar proportions, but not always in correspondence; thus the record of the surface-net on the 5th, 13th, 14th, and 18th was "numerous, few, many, few," while in the bottom-net it was "few, many, many, few" on the same dates. In the midwater-net they were especially abundant and large, ranging from  $\frac{3}{4}$  to 1 inch, and the reproductive organs were well developed. They formed an important element in the food of the various fishes at this season.

Only a portion of the life-history of the Annelids (*Polychæta*) is thus brought before us in the pelagic fauna; but it



is interesting to note how persistently the larval and post-larval forms of some species occur for months. Any danger which a limited spawning-period might engender is thus obviated. As soon as the later stages are reached, with the exception of *Tomopteris*, they cease to be pelagic, and have to be sought at the bottom or between tide-marks.

## 2. *On the British Species of Spinther.*

In his recent elaborate account of the genus *Spinther*\* Prof. L. von Graff has placed the form I had mentioned as *Spinther oniscoides*, Johnst., under *Spinther arcticus*, Wirén. The British form referred to was procured in the beginning of August 1865 from the long lines of the fishermen in the Minch. It was small, dead or nearly so, and rapidly decomposing, so that the dorsal lamellæ and other parts were injured. The original specimen of *S. oniscoides* is not in the British Museum, and is thought by Prof. Jeffrey Bell to have been lost, and some doubt then existed as to the minute characters. It differs from the other species which have been subsequently discovered, especially in regard to the cirrus on the parapodia and the presence of bristles with simple tips in the dorsal lamellæ.

A minute examination of the Hebridean specimen, however, shows that while the species is not *Spinther oniscoides*, Johnston, it is certainly not *S. arcticus*, Wirén. The contour and general structure approaches that of *S. miniaceus*, Grube, and in this Prof. von Graff now agrees with me. No cirrus is present, and the free lateral (circumferential) lamellæ diverge from the condition in the other two forms mentioned. The bristles of the dorsal lamellæ are bifid, any simple tips seen in the preparations being due to position (on edge). The ventral surface is marked by rows of minute warts, while the pharyngeal region in protrusion forms a smooth trumpet-like expansion, and thus differs from the organ in *S. arcticus*.

*Spinther* is one of the rarest British Annelids, and seems to be confined to the western shores. The Irish coast should be specially searched, as it is very desirable to have an example of the original species described by Dr. Johnston, which was sent to him from Belfast Bay (6-10 fathoms).

## 3. *On the Young Stages of the Gunnel (Centronotus gunnellus).*

In the paper on the "Development and Life-histories of Teleostean Fishes" an account is given of the gunnel from

\* Arbeiten aus d. Zoolog. Institut zu Graz, ii. Bd. No. 3 (1887).

the egg up to a stage when a hypural thickening occurred in the tail, which also presented fin-rays. At this stage\* "a well-marked interrupted line of black pigment runs from the cardiac region to the anus, passes forward and upward behind it, and is then continued to the tail; the marginal fin is continuous from the anus to the tail; a narrower [preanal] fin occurs in front of this, and it diminishes about the region of the gall-bladder, which is large and distinct. The dorsal fin again is similar and deepens a little in front of the caudal, which in outline is somewhat lobate. The fin-rays are present in the tail and are at this time better marked in the ventral (anal) than in the dorsal fin. They are also distinct in the pectorals. The snout now extends forward about half the diameter of the eye in front of it, and the mandible projects a little further, but is motionless, the animal aerating its gills in its progress through the water." The large size of the otocysts and their continuation upward so as nearly to meet in the median dorsal line is another interesting feature. At this stage they are fully 12 millim. in length. It may further be noted that the ventral median line of black pigment ceases before reaching a line from the pectorals, an oblique bar on each side, forming a  $\Lambda$  with the apex directed forward, occurring at this region, only a short streak of pigment existing in the middle line in front. No trace of ventral fins is apparent.

Lately (23rd May) the trawl-like bottom tow-net brought up a remarkably transparent fish about 35.5 millim. in length which gives us an intermediate stage between the foregoing and those which resemble the adult, though perhaps they only exceed this specimen by a few millimetres. The gunnel at this stage appears to live on the bottom, and probably hides amongst the sand like the young *Anguilla*, to which at first sight it has a close resemblance.

The proportions of this translucent fish differ materially from the earlier form. Thus the eye is much less in proportion to the size of the head and the latter occupies much less bulk in proportion to the body. Nevertheless the eyes seemed to be large and prominent in life when viewed from above. The eye has a silvery lustre laterally, emerald and dark olive-green when viewed from above. Ventrally a black pigment-line begins on the hyoid and continues along the median line to the anus, just as in the earlier form, except that in front it now passes between the separated limbs of the  $\Lambda$ -shaped arrangement. A line of the same pigment-dots behind the

\* M'Intosh and Prince, Trans. R. Soc. Edin. vol. xxxv. p. 869 (1890).

vent proceeded to the base of the tail. In addition to the foregoing a band of small though distinct black pigment-spots commenced on the lateral region behind the pectoral on each side and extended to the anal region. Moreover a single spot occurred on each side beneath the pectoral, and thus below the line just mentioned. A touch of the same pigment existed in front of the shoulder-girdle. During life all these pigment-specks were in a state of contraction; but as death approached they gradually assumed a stellate form, and thus the spirit-preparation shows the coloration much more distinctly than the living animal.

The pectoral fins are proportionally large. All the dorsal interspinous bones, as also the articulation of the fin-rays, are evident, whereas only the first three or four of the anal are seen, the first indeed alone presenting an articulation with the fin-ray. Thirty-seven hamal spines occurred in front of the anus. A few minute black pigment-specks were visible (under the microscope) along the spinal cord. The notochord remained simple from the anterior edge of the lower hypural to the termination, only a minute ventral knob occurring between the first and second hypural. Eight caudal rays abutted on the inferior or large hypural, three on the next above, then one more or less intermediate, three to the upper hypural, above which lay the tip of the notochord, while four rested on the epiurals. The total number was thus nineteen. Day gives fifteen as the number of the rays. The dorsal fin-rays were 79 or 80; Day gives 75 to 82. The anal fin had 44 rays; Day mentions 39 to 45. Only 11 pectoral rays were distinguishable; Day states the number to be 11 or 12. As the fish was quite translucent these numbers are of interest. Both dorsally and ventrally a portion of the larval fin existed in front of the caudal. The gall-bladder forms a distinct pale area at the posterior border of the liver. The urinary bladder is large and its opening conspicuous.

In the paper formerly referred to it was mentioned that young gunnels resembling the adults had been procured in July. They were captured off the Isle of May in the mid-water-net at 30 fathoms, but probably the net touched the bottom. They are only a few millim. longer than the foregoing translucent form, but they are thicker and more massive throughout, and the region from the base of the pectoral to the tip of the snout is longer. Moreover they have well-formed ventral fins. The pigment along the sides forms a series of reticulations with the long diameter of the ovoid pale spaces vertical. Eleven black bars are continued from the body to the dorsal fin without trace of the eye-like areas of the adult.

Similar though much fainter touches inferiorly proceed on the anal fin. Traces of the line of pigment seen at the younger stage a little above the ventral border of the abdomen are still present; but all the reticulations just described have been developed subsequently and independently. The median ventral pigment-line is also quite distinct from the branchiostegal region to the vent. The modification of the numerous and somewhat small lateral reticulations into the larger vertical bars of the adult is easily observed in a series, as also the gradual diminution of the pectorals. A characteristic feature of this young stage is the presence of a K-shaped arrangement of black pigment on each side of the head, the strong bar of the K uniting with its fellow over the brain and proceeding forward over the eye to the tip of the snout. One leg of the K goes from the eye straight downward to the edge of the mandible, while the other slopes backward to the opercular region.

The earlier stage here described would appear to represent a season's growth, and, indeed, it is possible that the later stage referred to is a form about two months older.

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XXIII.—*On the Anatomy of Sesia tipuliformis and Trochilium apiforme*, Linn. By Prof. E. K. BRANDT\*.

Two years ago, while studying the anatomy of *Sesia scolioformis*†, I discovered that the structure of the moth differs much from the usual Lepidopterous type, and I thought it would be interesting to compare the connexion between the outward form and the internal structure of other moths belonging to the same group. In the summer of 1887 I had an opportunity of dissecting several specimens of *Sesia tipuliformis* and *Trochilium apiforme*, and ascertained by repeated experiments that they agreed in most essential points.

\* Translated from the Russian by W. F. Kirby, F.L.S., F.E.S., &c. [The accompanying paper was written in June 1888, and published in 'Horæ Societatis Entomologicæ Rossicæ,' vol. xxxii. pp. 41-49, in 1889. I have not seen any translation or abstract elsewhere; and as the subject, relating to a very aberrant group of Lepidoptera, is of considerable interest and importance, and the languages of Eastern Europe are at present unfamiliar to many entomologists, I thought it might be useful to give the article a somewhat wider circulation.—W. F. K.]

† [This insect is very rare in England, and fresh specimens would be unattainable for dissection; but the other two species discussed in this paper are sufficiently abundant.—W. F. K.]